product data carboline® fireproofing systems

Pyrocrete â40

Selection & Specification Data

Generic Type

Cementitious inorganic polymer fireproofing formulation.

Description

Single powder component mixed with clean, potable water before it is used in application. Recommended uses for the fire protection of structural steel, bulkheads, and upgrading the fire resistance of any existing concrete. Recommended areas of application are pharmaceutical facilities, power plants, penthouses, schools & hospitals, abatement spray and air plenums.

Features

- Easily applied by spray or trowel
- Lightweight – 1/3 the weight of concrete for equal fire protection
- Most Economical – Offers a 40 lb/ft³ density.
- Coverage – outstanding coverage at 18.3 board feet.
- Excellent physical properties – hard, durable
- Nonflammable – during or after application
- Asbestos free – complies with EPA and OSHA regulations
- Chloride free – no special priming required
- Non-friable – high impact strength
- Single package – mixed with clean, potable water at the job site
- Investigated for exterior use by Underwriters Laboratories, Inc.
- Quality Manufactured – under strict Carboline quality standards.
- U.L. factory inspection service

Finish

If required, may be done by trowel, roller or brush typically within 1 – 2 hours after application of PYROCRETE 40.

Primers

PYROCRETE 40 neither promotes nor prevents corrosion. The fireproofing should not be considered as part of the corrosion protection system. For applications where primers are required, use an appropriate alkaline resistant primer. For contour applications where primers are recommended, PYROCRETE 40 must meet minimum U.L. bond strength criteria.

Selection & Specification Data (cont.)

Topcoats

Generally not required. In severely corrosive atmospheres, consult Carboline Technical Service for selection of the coating most suitable for the operating environment.

Dry Film Thickness

Recommended thickness depends on desired rating and assembly to be fireproofed. See attached design details.

Temperature Resistance

Not recommended for use a refractory cement or where operating temperatures exceed 200°F (93°C).

Physical Data (Typical Values)

Color	Non-Uniform	Speckled Gray
Density (Average)	ASTM E 605(1)	40 lbs./ft^3
Durometer Hardness(Shore D)	ASTM D 2240	40
Compressive Strength	ASTM E 761	594 psi
Coefficient of Thermal Expansion		5.8 X10^{-6} (inch / inch °F)
Combustibility	ASTM E 136	Non-Combustible
Bond Strength	ASTM E 736	1317 psf
Bond Impact	ASTM E 760	Pass
Impact Resistance	ASTM D2794	Indents at 20 foot pounds
Deflection	ASTM E 759	Pass
Average Flexural	ASTM D 790	136 psi
Maximum Strain	ASTM D 790	0.0094 in/in
Flame Spread	ASTM E 84	0
Smoke Development	ASTM E 84	10
Corrosion	ASTM E 937	0.00 gm/mm^2
Insulation "K" Factor	ASTM C177	1.06(BTU in/hr ft^2-F)
Specific Heat		.36 BTU/LB/°F
Shrinkage		<0.5%
Coverage 50 lb. bag (2)		18.3 Bd.Ft.
Shelf Life		Two years
1) Air dry at ambient conditions until constant weight. Do not force dry. Use ASTM E 605 Positive Bead Displacement.		
2) Material losses during mixing and application will vary and must be taken into consideration when estimating the job requirements.		

Test reports and additional data available upon written request.

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Approvals

Pyrocrete 40 has been tested by Underwriters Laboratories, Inc. and is classified for exterior or interior use.

It is listed under the following designs:

ASTM E119 (U.L. 263, NFPA 251)

Columns – X760, X761, X762, X763, X784, X785,Y707,Y708

Beams - N737, N738, N739, N740, N771, N772, N773, N774, N775, S717, S719,S731, S732, S733

Floor Ceiling Assembly - D774, D767, D768, D769, D770, D771, D773, D774, D775, D776, D777, D927, D928

Roof Assembly - P927, P928, P734, P735, P736, P737, P738, P739, P926, P929

Walls - U704

Precast Concrete & Steel Joist – G706, G707, G708, J713, J714, J715, J716

U.L. 1709

Rapid temperature rise that simulates a hydro-carbon fire exposure.

Columns - XR705, XR706, XR707

Packaging, Handling & Storage

Shipping Weight (Approximate)	Bag weight is 50 lbs. (22.7 kg) Truckload = 880 bags: 40 palletized bags and the pallet is plastic wrapped.
Storage	Material should be kept dry, covered, and off of the ground.
Storage Temperature & Humidity	-20°F to 150°F (-29°C to 66°C) 0 to 90% relative humidity
Shelf Life	Two years

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Substrates & Surface Preparation

General	Before applying PYROCRETE 40, the substrate coating must be free of all oil, grease, condensation, or other contamination.
Steel	Steel preparation before priming should be done in accordance with the recommended primers' Product Data Sheet.
Carbon Steel	Carbozinc® 11 Carboguard® 888 Carbozinc® 11 VOC Carbomastic® 90 Carbozinc® 11 HS Carboguard® 893 Carbozinc® 859 Carbocrylic® 120 Rustbond Penetrating Sealer®
Galvanized Steel	Normally not required, but may be required under corrosive conditions. Use Carboline Rustbond Penetrating Sealer.
Non-Ferrous Metals	Aluminum, copper, etc. shall be primed with one coat of Carboline Rustbond Penetrating Sealer
Wood or Concrete	The primer recommended is Carboguard® 1340.

Lathing & Attachments (Where required)

3.4 lbs./yd^2 (1.85 kg/m^2) galvanized metal lath, may be pre-bent and tie-wired into place for appropriate design. Optionally, beam furring clips, electrically welded, pneumatic, self-tapping screws or studs, may be used.

A. **Contour Design:** 3.4 galvanized metal lath wrapped around the flange edges toward the web approximately 1 1/2" (3.8 cm). Contour columns allow the use of chicken wire with beam furring clips as an alternate to the 3.4 metal lath. Please refer to design details.
For contour applications on structural members with web span greater than 16" (41 cm) or flange widths greater than 12" (31 cm), refer to the U.L. Fire Resistance Directory under "Coating Materials" section.

B. **Boxed Design:** 3.4 galvanized metal lath wrapped around member spanning the web, overlapped 1" (2.5 cm) and tie-wired on the flange face 12" (31 cm) on center. For large webbed members, additional support for lath may be needed for ease of installation. Optional use of plastic-nose corner beads may be used for better thickness control and aesthetics. See design details.

C. **Tower Skirts and Flat Surfaces:** Require that 3.4 galvanized metal lath be anchored on 12" to 24" (31-61 cm) centers depending upon requirements. The Lath should overlap and be tie-wired. On tower skirts only, PVC coated mesh can be used in lieu of 3.4 galvanized lath. Mesh shall be 2" x 2" 20 gauge wire coated with PVC as furnished by Carboline.

When ram set or welding is prohibited; a pneumatic fastener may be used.

Control joints are made on very large areas by scoring halfway through the thickness of Pyrocrete 40. This is achieved by using the trowel blade edge or an appropriate scoring tool. A preferred option would be the use of plastic nosed corner beads. Spacing should be on 10' (3 m) centers, both horizontally and vertically. Please refer to design details.

Application Equipment

Mixer

Use a heavy-duty mortar mixer with rubber tipped blades that scrape the sides and bottom of the mixer. A 50 lb. (20.7kg) bag of Pyrocrete 40 typically requires a mixer volume of 8 ft^3 (.23m^3) minimum.

Pumps

Mfg.	Model	Type	Size
Essick	FM9, FM5E	Rotor Stator	2L4
Muller	R-Tex 4AG50	Rotor Stator	2L4 2L6
Airtech	Swinger	Piston	N/A
Thomsen	PTV700	Dual Piston	N/A
PFT	ZP3V	Rotor Stator	2L6
Sunspray	220	Rotor Stator	2L4
Sunspray	EZ88	Rotor Stator	Super 2L6
Mayco	PF30	Dual Piston	N/A

Trowels

Standard plasterers' hawk and trowel may be used. A rubber float may also aid in finishing.

Compressor

Be certain that the air supply is a minimum 22 cfm at 100 psi (6.9 kPa) and higher when distances longer than 75' (23 m) are required.

Material Line

Minimum 1" (2.54 cm) I.D. hose with 300 psi minimum bursting pressure. For lengths over 50' (15 m) use 1 ½" to 3" (3.8 to 7.6cm) I.D. hose. Do not reduce hose diameter by more than ¼" (.7 mm) per 25' (7.6 m) unless a tapered conical reducer equipped with swivel fitting is used. A 10' (3 m) length of ¾" I.D. hose may be added at the gun for use as a whip.

Air Line

Use ½" (1.27 cm) I.D. line, with a minimum bursting pressure of 100 psi (6.9 kPa).

Spray Guns

Mfg.	Model	Fluid Tip	Air Cap
Binks	7E2	47 or 49	3/8" or ½" (9.5-13mm)
Graco	204000	167331	160658
SpeeFlo	701	3/8"-1/2" (9.5-13mm)	3/8"-1/2" (9.5-13 mm)
Plasterers	N/A	3/8"-1/2" (9.5-1.3mm)	N/A
Air Tech	Internal Mix	3/8"-1/2" (9.5-13mm)	N/A

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Mixing & Thinning

Mixing

Add 4 ¾ ± 3/4 gallons (18 ± 2.8 liter) of clean, potable water to a mortar mixer with rubber tipped blades. With mixer running slowly, add powder and mix for 2 minutes minimum (9 minutes maximum) until a homogeneous mortar-like consistency is achieved. Total water *must not* exceed 5.50 gallons (20.8 liters) per 50 lb. (22.7 kg) bag. In cool weather, warm water may be used to enhance application. In hot weather, cool/cold water may be used.

Density

Typical wet nozzle density is 56-60 lbs/ft^3 (.09-1.0 g/cm^3). In order to check wet densities, fill a 5-ounce (150 ml) Dixie cup with mixed material, screeding the excess mixture until even with the rim of the cup, and weigh it on a gram scale. Multiply the weight in grams by 0.415 to calculate the density in lbs./ft^3. If weighed in ounces (avdp.), multiply the weight by 11.77 to get the density in lbs./ft^3. Example: If the Dixie cup weights 142.17 grams: Wet Nozzle Density = 142.17 grams X .415 =59 lbs/ft^3 .

Pot Life

2 hours at 70°F (21°C) and less at higher temperatures. Pot life ends when the material thickens and becomes unusable.

Application Procedures

PYROCRETE 40 may be applied by spray and/or trowel. Film build will depend on application method, weather conditions and equipment used. For application overhead, a scratch coat of up to ½" (1.3 cm) is recommended to key into the lath. Allow to set for approximately 1-2 hours at 70°F (21°C) before applying the subsequent coats. It is recommended that the total required thickness be applied within a 24 hour period. If this is not possible, the preceding coats should be left as sprayed or scored after the initial 24 hour period, PYROCRETE 40 should be dampened with water before application of additional coats.

- Maximum time to achieve the full thickness is 3 days at 70°F (20°C) and 50% RH. This would be less at higher temperatures.
- All additional coats are to be applied monolithically to the entire perimeter of the member.
- At no time shall PYROCRETE 40 be applied at a thickness less than ¼" (7mm) or "skim" coated.

Application Conditions

	Surface or Ambient Temperature		Relative Humidity	
	Minimum	Maximum	Min.	Max.
Interior or Exterior	40°F(4°C)	100°F(38°C)	0%	95%

Finishing

If a smooth finish is required, this may be done by trowel, roller or brush typically immediately or up to 2 hours after final application of Pyrocrete 40.

Protection of Adjacent Surfaces

Finished surfaces shall be protected from damage and overspray. Encapsulation of aluminum electrical conduits is not recommended.

Curing Schedule

Fresh PYROCRETE 40 must be protected from rain or running water for 24 hours at 70°F (21 °C). In low humidity, high temperature, direct sun or wind, the PYROCRETE 40 surface should be kept damp for at least 12 hours by applying a water mist or wrapping in plastic sheets to reduce rapid water loss.
Caution: Do not start work if ambient temperatures are expected to drop below 35°F (2°C) for 24 hours after application.

Topcoating

Seal Coat – In corrosive environments, use an appropriate topcoat. If topcoating is required, apply Carboguard 1340 as a seal coat. Carboguard 1340 may be applied after 24 hours of final application of Pyrocrete 40. Consult the Carboguard 1340 Product Data Sheet for minimum and maximum cure times.

Top Coat – Surface hardness should be a minimum shore D 40 as measured with a Durometer prior to application of the topcoat. Normally, this minimum dry time is 10 days at 70°F (21°C) and 40 days at 40°F (4°C), for thickness of 1" (2.54 cm) or less.

Caulking – Carboline Acrilast 570 WB should be used where the termination of PYROCRETE 40 occurs with the substrate for all exterior installations.

Cleanup & Safety

Cleanup

Pump, mixer and hose should be cleaned with clean, potable water at least once every 4 hours at 70°F (21°C), and more often at higher temperatures.
Wet PYROCRETE 40 overspray must be cleaned up with soapy or clean, potable water. Cured overspray may require chipping and/or scraping to remove.

Safety

1. Do not breathe dust. PYROCRETE 40 is caustic and will irritate mucous membranes. Use OSHA approved dust mask while mixing.
2.For eye contact, flush with copious amount of water in accordance with OSHA Instructions. Goggles or safety glasses are always recommended.
3. Wash skin with clean water to prevent irritation.

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